

REMARKS

Claim Rejections - 35 USC §102

Claims 1-3, and 7 are rejected under 35 U.S.C. §102(b) as being anticipated by Long et al. (U.S. Patent No. 6,306,710 B1, hereinafter “Long”).

Regarding claim 1, Applicants respectfully traverse the rejections since the Applicants’ claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Long of:

“forming layers of gate dielectric material, gate material, and cap material on a semiconductor substrate;
processing the cap material and a portion of the gate material to form a cap and
a gate body portion;” [underlining for clarity]

The Examiner states in the Office Action of 7-5-05 (hereinafter the “Office Action”):

“Long anticipates...in fig. 15, cap material 296 on a semiconductor substrate;
in fig. 15, processing the cap material...to form a cap...;” [underlining and deletion for clarity]

However, it would be obvious to those having ordinary skill in the art that the Long material 296 of Long FIG. 15 is an insulating interlayer dielectric layer (ILD) 296 as described in Long col. 9, lines 18-20:

“Field oxides 296 may also be deposited for electrical isolation of the components of the MOSFET.”

Thus, the Long material 296 does not meet the requirements for a cap material which is used to form a cap that is used as a mask for etching a gate body portion as disclosed in Specification page 3, line 30, through page 4, line 2:

“A mask (not shown) has been deposited and processed for the etching of the cap material layer 108 to form a cap 200. The cap 200 is used as a mask for the etching of the gate material layer 106 to form a gate body portion 202 with a gate thin layer portion 204 of gate material still remaining over the gate dielectric layer 104.” [underlining for clarity]

The CAFC in the recent case of Phillips v. AWH Corp. 03-1269, -1286 (Fed. Cir. July 12, 2005) (*en banc*) stated that the Specification provides the meaning of claim terms:

“[O]ur cases recognize that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs. See *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). ... the inventor has dictated the correct claim scope, and the inventor’s intention, as expressed in the specification, is regarded as dispositive. See *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.* 242 F.3d 1337, 1343-44 (Fed. Cir. 2001).

Based on the above, it is respectfully submitted that Long does not disclose a cap material layer or a cap as claimed.

Further regarding claim 1, Applicants respectfully traverse the rejections since the Applicants’ claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Long of:

“processing the cap material and a portion of the gate material to form a cap and a gate body portion;
forming a wing on the gate body portion from a remaining portion of the gate material;” [underlining for clarity]

The Examiner continues in the Office Action:

“[Long anticipates]...in fig. 15, processing...a portion of the gate material to form...a gate body portion;
in fig. 6, forming a wing, width of 222 to the bottom of 230, on the gate body portion from a remaining portion of the gate material, col. 5, lines 42-53;...” [underlining and deletions for clarity]

However, it is respectfully submitted that FIG. 15 shows the completed device with no processing of the gate material. Further, Long FIG. 6 uses only one step for forming a gate body portion and no step of forming a wing as disclosed in Long col. 5, lines 32-41:

“Referring to FIGS. 3, 6, and 7, with the concentration profile 232 of FIG. 7, the concentration of the dopant is higher toward the bottom 216 of the layer of gate structure material 206 and is lower toward the top 212 of the layer of gate structure material 206. With such a concentration profile 232 of FIG. 7, the layer of gate structure material 206 etches faster toward the bottom of the layer of gate structure material 206 and etches slower toward the top 212 of the layer of gate structure material 206. Thus, the gate structure 230 of FIG. 6 has a longer length 222 toward the top 212 of the layer of gate structure 230 such that the gate structure 230 is substantially T-shaped.”

Thus, Long does not disclose processing to form a gate body portion and forming a wing on the gate body portion from the gate body portion.

Based on all of the above, it is respectfully submitted that claim 1 is allowable under 35 U.S.C. §102(b) as not being anticipated by Long.

Regarding claim 2, this dependent claim depends from independent claim 1 and is believed to be allowable since it contains all the limitations set forth in the independent claim from which it depends and claims unobvious combinations including forming the wing in claim 2, which includes the step of rounding the outside edges, because Long does not have this step of forming the wing.

Regarding claim 3, this dependent claim depends from independent claim 1 and is believed to be allowable since it contains all the limitations set forth in the independent claim from which it depends and claims unobvious combinations including forming the lightly-doped source/drain region additionally using the first spacer.

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that the Long spacer 262 is used for doping the heavily-doped source and drain 272 and 274 as shown in Long FIG. 13.

Regarding claim 7, this dependent claim depends from independent claim 1 and is believed to be allowable since it contains all the limitations set forth in the independent claim from which it depends and claims unobvious combinations including forming a metal contact over the gate body portion.

It is respectfully submitted that Long element 286 is a silicide, not a metal, contact as disclosed in Long col. 8, line 62:

“A gate silicide 286...” [deletion for clarity]

Based on all of the above, it is respectfully submitted that the independent claim 1, and the respective claims 2-3 and 7 depending therefrom, are not anticipated by Long under 35 USC §102 because:

“Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*” [*emphasis added*] Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co. (730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)(citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)))

Claim Rejections - 35 USC §103

Claims 4-6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Long et al. (U.S. Patent No. 6,306,710 B1, hereinafter “Long”) as applied to claims 1-3, and 7 above, and further in view of Chakravarthi et al. (U.S. Patent No. 6,797,593 B2, hereinafter “Chakravarthi”).

Regarding claims 4-6, these dependent claims respectively depend from independent claim 1 and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations thereof.

In addition, as explained for claim 1, Long does not contain the claim limitations that would make it a viable reference under 35 U.S.C. §103(a) because:

“[T]he prior art reference (or references when combined) must teach or suggest **all** the claim limitations.” [bold for emphasis] *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Further with regard claim 4, it is respectfully submitted that the combination of Long and Chakravarthi, taken as a whole would be inoperative. It would be obvious to one having ordinary skill in the art that the multiple spacers of Chakravarthi FIGs. 5C through 5F would move the implantations of Long FIGs. 8 and 9 out from the gate and prevent the Long lightly-doped source and drain from being formed under the Long gate.

Thus, claim 4 is believed to be allowable under 35 U.S.C. §103(a) based on Long in view of Chakravarthi because:

“If references taken in combination would produce a “seemingly inoperative device”, we have held that such references teach away from the

combination and thus cannot serve as predicates for a prima facie case of obviousness.” *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)[deletion for clarity]

Claims 5-6 have been addressed above.

Further regarding claims 4-6, the Examiner continues in the Office Action:

“Chakravarthi gives motivation [for the combination] in col. 2, line 64 - col. 3, line 15. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Chakravarthi's process with Long's invention would have been beneficial because it forms an improved drain extension.”

Applicants respectfully disagree. As explained above for claim 4, the multiple spacers of Chakravarthi would prevent the Long FIG. 8 and 9 implantations of the drain pocket 242, the source pocket 244, the drain extension 252, and the source extension 254. Thus, there would be no “improved drain extension.” Therefore, there is no motivation for the combination and claims 4-6 are allowable under 35 U.S.C. 103(a) because the CAFC has held that the conclusion of obviousness may not be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference. *In re Sang-Su Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002).

Claims 8, 9, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Long et al. (U.S. Patent No. 6,306,710 B1, hereinafter “Long”) in view of Wolf et al. (Silicon Processing for the VLSI Era, V. I, pp. 191-4, hereinafter “Wolf”).

With regard to claim 8, as explained for claim 1, Long does not contain the claim limitations that would make it a viable reference under 35 U.S.C. §103(a) because the resulting combination would not teach or suggest all the claim limitations. *In re Vaack, supra*.

Further with regard to claim 8, the Examiner states in the Office Action:

“Long does not teach using nitride cap layers or spacers, but Wolf teaches using nitride. Wolf teaches using nitride and gives motivation on p. 191, fourth paragraph. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Wolf's process with Long's invention would have been beneficial because it is nearly impervious barrier to diffusion.”

As explained with regard to claim 1, it is respectfully submitted that Long does not teach a cap layer so there is no motivation for using the Wolf nitride to make something that does not exist in Long.

Further, it is respectfully submitted that, assuming *arguendo* that the Long ILD 296 were the cap layer, Wolf teaches away from using silicon nitride because Wolf states in Wolf page 191, third paragraph:

“Silicon nitride also has a high dielectric constant...making it less attractive for interlevel insulation because of the resultant higher capacitance between conductor layers.”

Based on the above, it is respectfully submitted claim 8 is allowable under 35 U.S.C. 103(a) as being patentable over Long in view of Wolf because:

“We have noted elsewhere, as a “useful general rule,” that references that teach away cannot serve to create a prima facie case of obviousness...” *In re Gordon, supra*. [deletion for clarity]

Regarding claims 9, 11, and 14, it is respectfully submitted that these dependent claims respectively depend from independent claim 8 and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations.

Based on all the above, it is respectfully submitted claim 8 is allowable under 35 U.S.C. 103(a) as being patentable over Long in view of Wolf because of *In re Gordon, supra*.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Long et al. (U.S. Patent No. 6,306,710 B1, hereinafter “Long”) in view of Wolf et al. (Silicon Processing for the VLSI Era, V. I, pp. 191-4, hereinafter “Wolf”) as applied to claims 8, 9, and 14 above, and further in view of Chakravarthi et al. (U.S. Patent No. 6,797,593 B2, hereinafter “Chakravarthi”).

Regarding claims 10-13, it is respectfully submitted that these dependent claims respectively depend directly or indirectly from independent claim 8 and are believed to be

allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations.

Further, it is respectfully submitted that the explanations applied to claims 1, 4-6 and 9, 11, and 14 are also applicable hereto and are incorporated by reference thereto.

Based on all the above, it is respectfully submitted claims 10-13 are allowable under 35 U.S.C. 103(a) as being patentable over Long in view of Wolf and further in view of Chakravarthi because of *In re Gordon, supra*.

Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 1-22 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



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